11. BOOK BINDING, Binding-Machines.
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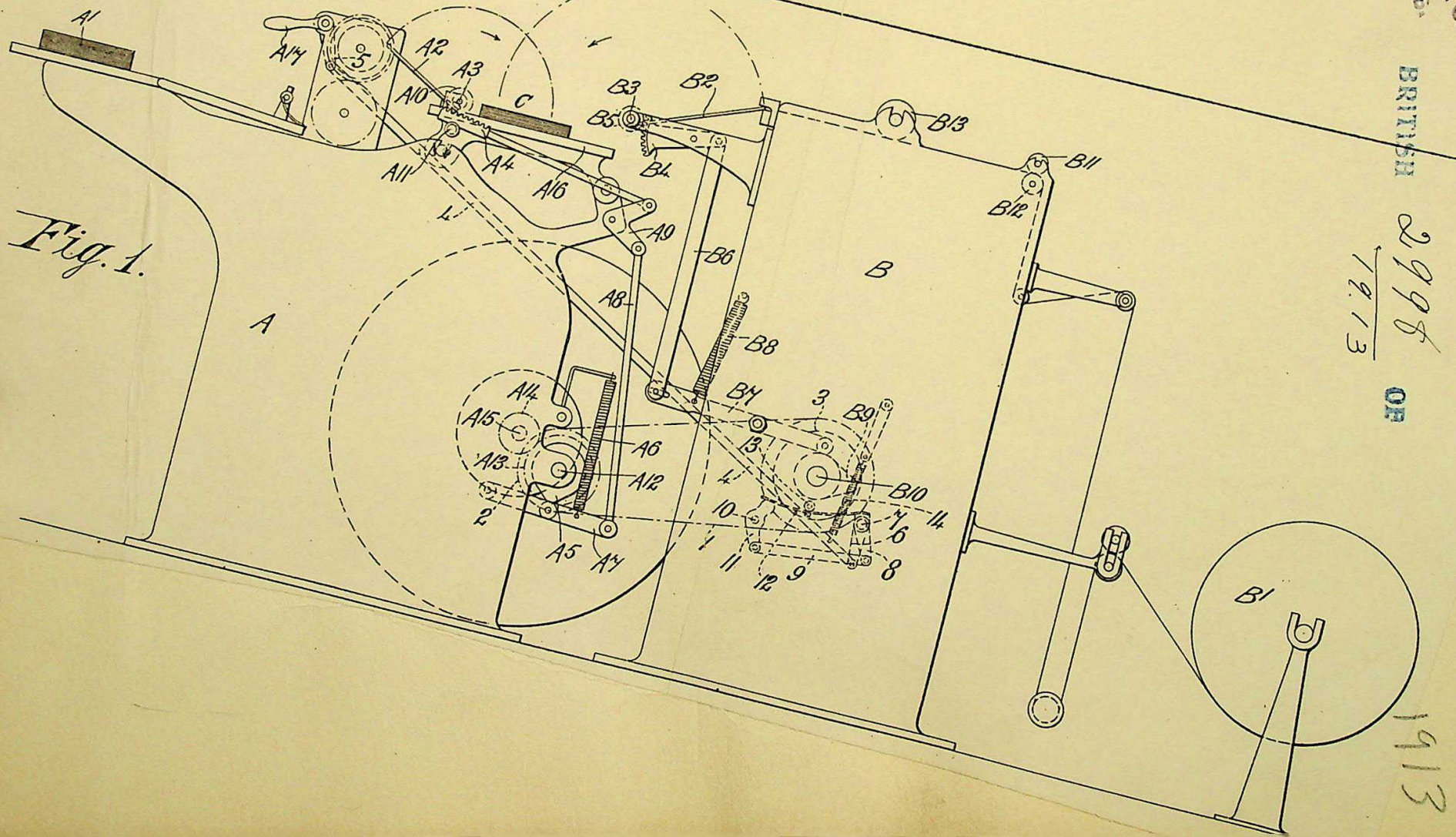

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II. BOOK BINDING,

Binding-Machines.

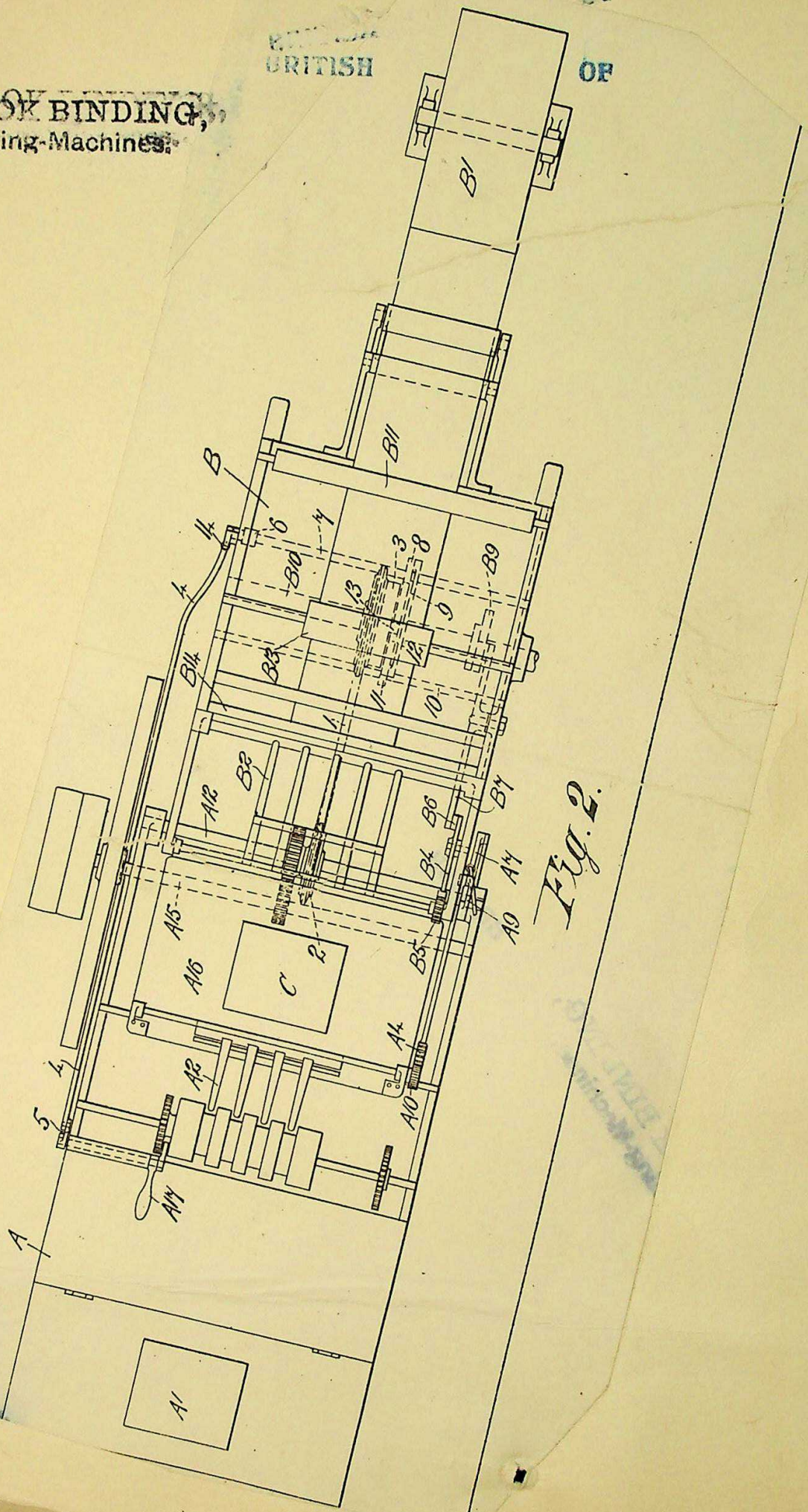

Fig. 2.

11. BOOK BINDING,
Binding-Machines.

N° 2998 A.D. 1913

DUPLICATE

Date of Application, 5th Feb., 1913
Complete Specification Left, 2nd Aug., 1913—Accepted, 5th Feb., 1914

PROVISIONAL SPECIFICATION.

Improvements in or relating to Sheet Delivering and Piling Apparatus.

I, JOHN EDWARD NORMAN, of Milligan Lodge, Milligan Road, Aylestone Park, Leicester, Manager, do hereby declare the nature of this invention to be as follows:—

This invention relates to sheet delivering and piling apparatus and has for its object the composing or collating of sheets of paper which are intended to be subsequently formed into books, block pads, writing pads and the like.

It is well known that in the production of (what may be cited by way of example) duplicating or manifolding books, pads and the like, sheets of different characters, denominations, values or qualities alternate with each other, these being varied according to the purpose for which the book, pad or the like is ultimately intended and as far as is known the collating of these leaves or sheets in successions of different characters, denominations, values or qualities has necessitated the employment of hand labour to a considerable extent. The leaves or sheets may, in the case of plain sheets of different kinds or qualities have been cut to the required size upon the same or different machines, or the said sheets may have been printed, paged, numbered, perforated or ruled upon different machines, but it has invariably been necessary to subject the sheets to considerable manipulation at the hands of the operator, after they have passed through the machine or machines in order to collate, compose or assemble them in their proper and alternating order to make them ready for being bound or made up into manifolding or duplicating books, pads or the like, or for analogous purposes.

This invention is designed to cheapen the cost of production of books, pads and the like of the character hereinbefore referred to by eliminating the element of hand labour or manipulation and providing a machine or apparatus by which the sheets or leaves for the purposes named, may be automatically piled up in the desired order and alternation and made ready for being bound or fastened together for use.

In its simplest form the invention may comprise two sheet delivering machines dealing with plain sheets of different qualities or thickness for use in the production of manifolding books having thick sheets and thin sheets alternating throughout the book, the thick sheet being what may be termed the "original" upon which may be written a letter, invoice, receipt, order or quotation to be torn out and sent to a customer, while the thin sheet is what is known as the "copy" or "duplicate" to be retained by the owner of the book for future reference, the said copy being produced by a carbon sheet interposed between the thick sheet and the thin sheet before the writing takes place on the former.

These sheets as already remarked are quite plain, but the present invention comprehends sheet delivery and piling apparatus for dealing with either plain, printed, ruled, paged or perforated sheets or with combinations of these features, the essential feature of the invention being that the apparatus is constructed

so as to deliver these sheets in the desired or pre-arranged alternation on to a common board or support so that they are piled up and collated ready to be made up into book form, pads or the like as hereinbefore mentioned.

The invention comprehends within its scope and ambit the combination of two or more machines for delivering sheets and co-operating mechanism arranged in such a manner to cause each machine to deliver its sheets alternately at a common point so that the sheets are piled up one on top of the other preparatory for use in any of the directions herein named.

For this purpose the co-operating mechanism may be applied to at least two machines each delivering a sheet of different kind or quality, or to a printing machine and a plain sheet delivering machine, or to two machines delivering paged, numbered, perforated or ruled sheets or any combination of two of such sheets according to the purpose for which the sheets are required.

It may also be convenient at times to combine two machines, one delivering plain, paged, printed, ruled or perforated sheets or combinations of these features, with a machine delivering carbon sheets in alternation, or the machine may deliver sheets having a carbonized surface.

According to a concrete example of the present invention two machines having sheet delivery mechanism may be placed in juxta position so that the fliers or devices which deliver the sheets may be in a position when working to deliver their sheets on to a common support, table or the like intermediate of the same.

Both machines may be coupled up by chain and chain wheels or other convenient mechanism to run at the same speed and means are employed to operate the fliers or sheet delivery devices so that they are timed to land their sheets on the same pile or supporting board alternately so that there is a continuous and successive alternation of the sheets of the two machines.

Further, provision is also made so that if a misfeed takes place with one machine the fliers or sheet delivery devices of the other machine can be simultaneously put out of operation thereby avoiding any error in the piling, such for instance as allowing two or more sheets of the same kind and from the one machine to be piled in succession one on top of the other and thus irregularizing the order of the sheets.

One arrangement for obtaining alternation of delivery action on the part of the fliers or delivery devices of the two machines is to arrange a cam on the driving shaft of one machine which is timed and arranged to operate the fliers through link and lever or equivalent connections at the required moment.

In order to stop the other machine when a misfeed occurs with one machine, say the printing machine, the latter is coupled up with the other machine so that upon the operator moving the usual hand lever of the printing machine to stop the feed or feed cylinder, intermediate connections are actuated so as to declutch the driving gear and thus synchronise the stopping of the two machines.

The said usual hand stopping lever of the one machine when moved operates link and lever connection which separate two parts of a clutch on the driving shaft and thus stops the machine and the opposite movement of the said hand lever reverses the operation of the connection and starts both machines into work again.

A most useful form of the invention consists in combining a printing machine which delivers printed bill heads with a machine which delivers plain sheets of paper to form the duplicate of any matter which is written on the bill heads.

The printing machine may be of any convenient type and the two machines may be coupled as hereinbefore described to deliver their sheets alternately on to a common support or piling board.

The printing machine is fed with plain sheets by an operator in the usual manner, but the other machine is provided with a continuous roll of paper which is drawn through the machine by rollers operated by any of the well known mechanisms used in printing and similar machines and a knife is stationed near the usual delivery rollers of the machine so as to descend and cut

off a sheet of the desired size in the usual manner prior to the latter falling onto the fliers for delivery onto the pile in the manner hereinbefore described.

The invention is not limited to the precise mechanism of either of the two or more machines which are employed for the purpose named, but involves within its scope and ambit the broad and generic feature of two or more sheet delivery apparatus combined with mechanism which effects the alternate delivery of the sheets from the two or more machines onto a common pile or support for the purpose named.

Dated this 21st day of January, 1913.

E. N. LEWIS,
Fellow of the Chartered Institute of Patent Agents,
Berridge Street Chambers, Leicester,
Agent for the Applicant.

COMPLETE SPECIFICATION.

Improvements in or relating to Sheet Delivering and Piling Apparatus.

I, JOHN EDWARD NORMAN, of Milligan Lodge, Milligan Road, Aylestone Park, Leicester, Manager, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to sheet delivering and piling apparatus and has for its object the composing or collating of sheets of paper which are intended to be subsequently formed into books, block pads, writing pads and the like.

It is well known that in (which may be cited by way of example) duplicating or manifolding books, pads and the like, sheets of different characters, denominations, values or qualities alternate with each other, these being varied according to the purpose for which the book, pad or the like is ultimately intended. In the production of such books, pads and the like the collating of these leaves or sheets in alternating or desired order has, as far as I am aware, when the different sheets have been delivered by separate machines, necessitated the employment of hand labour to a considerable extent.

The object of this invention is to eliminate the element of hand labour or manipulation in such cases *i.e.* where the sheets are delivered by separate machines, and devise an arrangement whereby the sheets or leaves for the purpose named, may be automatically piled up in the desired order and alternation and made ready for being bound or fastened together for use.

Broadly considered, the invention consists of the arrangement in juxtaposition of two or more machines—each capable of delivering sheets so that the respective sheet delivering devices thereof deliver their sheets at a point common to all, and the employment with such juxtaposed machines of driving mechanism connecting same whereby one is driven from another in timed relation thereto so that the sheet delivering devices of the said machines operate in prearranged order to pile the sheets one upon another for the purpose described.

In its simplest form the invention may comprise the combination in the aforesaid manner of two sheet delivering machines dealing with plain sheets of different qualities or thickness for use in the production of manifolding books having thick sheets and thin sheets alternating throughout the book, the thick sheet being what may be termed the "original" upon which may be written a letter, invoice, receipt, order or quotation to be torn out and sent to a customer, while the thin sheet is what is known as the "copy" or "duplicate" to be retained by the owner of the book for future reference, the said copy being

produced by a carbon sheet interposed between the thick sheet and the thin sheet before the writing takes place on the former.

The sheets dealt with, as already remarked, may be quite plain, but the two or more machines arranged in combination according to this invention may be such as will deal with either plain, printed, ruled, paged or perforated sheets, or with combinations of such sheets, the essential feature of the invention being that the several machines are combined and co-related so as to deliver their sheets in the desired or pre-arranged alternation or order at a common point so that they are piled up and collated ready to be made up into book form, pads or the like as hereinbefore mentioned.

Co-operating mechanism as aforesaid is employed and arranged to combine at least two machines each delivering a sheet of different kind or quality, or it may combine together a printing machine and a plain sheet delivering machine, or it may be applied to two machines delivering paged, numbered, perforated or ruled sheets, or any combination of such sheets according to the purpose for which the sheets are required.

It may also be convenient at times to combine two machines, one for delivering plain, paged, printed, ruled or perforated sheets or combinations of these features, with a machine delivering carbon sheets in alternation with the sheets delivered by the other machine or the machine may deliver sheets having a carbonized surface.

According to a concrete example of the present invention, two machines may be coupled up by chain and chain wheels or other convenient mechanism to run at such relative speeds that the fliers or sheet delivery devices will operate to land their sheets on the same pile or supporting board alternately so that there is a continuous and successive alternation of the sheets of the two machines.

Further, provision is also made so that if a misfeed takes place with one machine the fliers or sheet delivery devices of the other machine can be simultaneously put out of operation thereby avoiding any error in the piling, such for instance as allowing two or more sheets of the same kind and from the one machine to be piled in succession one on top of the other and thus irregularizing the order of the sheets.

Machines are already known, which, for such purposes as associating and interleaving sheets and for inserting slip sheets or set off sheets between printed sheets, are each furnished with a plurality of mechanism operating in combination for delivering the sheets in desired order. The present invention differs from machines of this kind in that it comprises, in contradistinction to multiple mechanisms in one machine, the coupling together, in the manner and by the means aforesaid, of separate machines (it may be of known type), each of which is adapted to deliver individual sheets in succession which sheets from the separate machines require to be collated for the purpose hereinbefore mentioned, and which sheets without the use of this invention would have to be taken from the separate machines and collated by hand or in a further operation.

In order that the invention may be more clearly and readily understood, reference will be made, in further describing the same, to the accompanying drawing, wherein is shown by way of example, a practical embodiment of the invention, consisting of two machines combined and arranged to co-operate to deliver and collate their sheets in an alternating manner.

In the drawing referred to—

Figure 1 is an elevation and

Figure 2 is a plan.

Like parts are designated by the same reference characters in both figures of the drawing.

In the concrete embodiment illustrated, A is a printing machine and B is a sheet delivering machine. These two machines each have the characteristic features and mechanisms of machines of their type and are of known construction and as far as their individual operations are concerned, each machine

operates in the customary manner. That is to say, the machine A prints (and it may be also perforates) sheets which are fed in by hand from a pile A^1 the printed sheets being subsequently delivered by a flier A^2. The machine B draws paper from a roll B^1 and cuts it up into sheets and delivers such sheets by a flier B^2. The flier A^2 of the machine A is actuated about a centre A^3 by a toothed rack A^4 moved conjointly by a cam A^5 and spring A^6 through the medium of a lever A^7, connecting rod A^8 and bell-crank A^9, the rack engaging a pinion A^{10} on the axis of the flier A^2. The rack A^4 is guided in gear with the pinion A^{10} by a roll A^{11}. The shaft A^{12} on which the cam A^5 is mounted is driven by gears A^{13} A^{14} from the main driving shaft A^{15}.

The flier B^2 of the machine B is movable about a centre B^3, being actuated by a rocking segment B^4 which gears with a pinion B^5 on the axis of the flier, the segment receiving motion by a link B^6 from a lever B^7 operated conjointly by a spring B^8 and a cam B^9 on a driving shaft B^{10}.

The paths of the fliers A^2 and B^2 are shown by dot and dash lines in Figure 1 and it will be seen that the two machines A and B are so fixed in relation to each other that the said two fliers deliver the sheets from the respective machines at a common point C on the table or board A^{16} of the machine A.

For driving purposes the two machines are coupled together by co-operating mechanism comprising a driving chain 1, a chain wheel 2 on the shaft A^{12} of the machine A, and a chain driven clutch 3 on the shaft B^{10} of the machine B. The chain 1 transmits driving motion from the machine A to the machine B and the speed of one machine is so timed and regulated in relation to that of the other that the fliers A^2, B^2 work in alternation for sheet delivering purposes with the result that a sheet is delivered at C from first one and then the other machine thus producing a pile of alternating sheets at the common point of delivery.

The feed cylinder or operative members of the printing machine A can be put into and out of action independently of the shaft A^{12} (which latter may be continuously driven when the machine is in use), by a handle A^{17}. In order that both machines may be stopped when a misfeed occurs on one machine, the driving clutch 3 of the machine B is coupled up with the usual handle A^{17} of the machine A so that upon the operator moving this to stop the feed cylinder of the machine A the intermediate coupling means will effect the declutching of the driving mechanism of the machine B and thus the two machines will be stopped simultaneously. A convenient arrangement of said connecting means consists of a rod 4 connected at one end to an arm 5 on the axis of the handle A^{17} and at the other end to an arm 6 on the end of a rockshaft 7. On the rockshaft 7 is fixed an arm 8 which, by means of a link 9, actuates a second rockshaft 10 having thereon an arm 11 to which the link 9 is connected. A spring band 12 is carried by the upper ends of the arms 8 and 11 and, when the shafts 7 and 10 are rocked, is moved by said arms up and down in relation to a roll 13 which projects from the side of the clutch 3 and rotates therewith. When the band 12 is in one position it is out of the path of the roll 13 and the clutch 3 drives the machine B, but when the band 12 is moved to the other position, the roll 13 rides thereon and is caused to move inwards in the clutch to disconnect the latter and stop the machine. A spring 14 holds the connecting means in one position or the other. By means of the connecting means described, a movement of the handle A^{17} to render the machine A operative or inoperative will also effect the simultaneous control of the machine B for the same purpose.

The combination of machines illustrated in the drawing comprises a most useful form of the invention as the printing machine A may be employed to deliver printed bill heads while the machine delivers plain sheets of paper to form the duplicate of any matter which will be written on the bill heads.

In using this particular combination of machines, the printing machine is, as before mentioned, fed by hand with plain *i.e.* unprinted sheets, the other machine drawing its supply from a continuous roll B^1, the paper being drawn

through the machine by rollers *e.g.* B^{11}, B^{12}, B^{13} operated by any of the well known mechanisms used in printing and similar machines, a knife B^{14} being suitably located and actuated to cut off a sheet of the desired size in the usual manner prior to the latter falling onto the flier B^2 for delivery upon the pile C in the manner hereinbefore described.

The invention is not limited to the precise mechanism of either of the two or more machines which may be combined in the manner and for the purpose herein set forth. That is to say, it is immaterial, as far as this invention is concerned, whether the said machines so combined are provided with mechanisms for printing, perforating, punching, ruling and so on, or whether they are merely sheet delivery machines, either or each of them may be capable of performing one or more of such functions in the manner and by the means common to machines of this kind. Further it is immaterial as to whether the machines are fed by separate sheets or whether the paper is in a roll form.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. The arrangement in juxtaposition of two or more machines—each capable of delivering sheets—so that the respective sheet delivering devices thereof deliver their sheets at a point common to all, and the employment with such juxtaposed machines of driving mechanism connecting same whereby one is driven from another in timed relation thereto so that the sheet delivering devices of the said machines operate in prearranged order to pile the sheets one upon another for the purpose described.

2. In sheet piling apparatus characterised by the subject matter of the preceding claim, the provision of means for controlling the driving mechanism whereby the combined machines may be simultaneously started and stopped or rendered operative and inoperative, for the purpose described.

3. In combination, a printing or analogous machine, a sheet cutting or analogous machine, the fliers of said machines operating to deliver sheets upon a table or support intermediate of and common to both the machines, connecting driving mechanism consisting of a chain and chain wheels between said machines whereby the fliers are caused to operate in alternation, and a clutch and actuating connections between it and the controlling member of one machine to render the driving mechanism between said machines inoperative when one machine is put out of action by the actuation of the aforesaid member, substantially as and for the purpose described.

4. Sheet piling apparatus comprising the arrangement, combination and operation of a plurality of machines, substantially in the manner as and for the purpose described with reference to the accompanying drawing.

Dated this 24th day of July, 1913.

JOHN EDWARD NORMAN.

E. N. Lewis,
Fellow of the Chartered Institute of Patent Agents,
Berridge Street Chambers, Leicester,
Agent for the Applicant.

Redhill: Printed for His Majesty's Stationery Office, by Love & Malcomson, Ltd.—1914.